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Date: August 14, 2006 /Carrie A. Patchin/
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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re patent application of:			
Applicant(s):	D. Maxwell Chickering *et al.*	Examiner:	Akiba K. Robinson Boyce
Serial No:	09/681,050	Art Unit:	3639
Filing Date:	December 8, 2000		

Title: DECISION THEORETIC APPROACH TO TARGETED SOLICITATION BY MAXIMIZING EXPECTED PROFIT INCREASES

Mail Stop Appeal Brief-Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

APPEAL BRIEF

Dear Sir:

Appellants submit this brief in connection with an appeal of the above-identified patent application. A credit card payment form is filed concurrently herewith in connection with all fees due regarding this appeal brief. In the event any additional fees may be due and/or are not covered by the credit card, the Commissioner is authorized to charge such fees to Deposit Account No. 50-1063 [MSFTP282US].

I. Real Party in Interest (37 C.F.R. §41.37(c)(1)(i))

The real party in interest in the present appeal is Microsoft Corporation, the assignee of the present application.

II. Related Appeals and Interferences (37 C.F.R. §41.37(c)(1)(ii))

Appellants, appellants' legal representative, and/or the assignee of the present application are not aware of any appeals or interferences which may be related to, will directly affect, or be directly affected by or have a bearing on the Board's decision in the pending appeal.

III. Status of Claims (37 C.F.R. §41.37(c)(1)(iii))

Claims 1-11 and 13-30 stand rejected by the Examiner. Claim 12 has been cancelled. The rejection of claims 1-11 and 13-30 is being appealed.

IV. Status of Amendments (37 C.F.R. §41.37(c)(1)(iv))

No amendments were made to claims after the Final Office Action dated March 13, 2006.

V. Summary of Claimed Subject Matter (37 C.F.R. §41.37(c)(1)(v))

A. Independent Claim 1

Independent claim 1 recites a computer-implemented method for soliciting a sub-population of a population, comprising: employing a computer-implemented component to identify the sub-population to solicit and a non-solicited sub-population by using a computer-implemented decision theoretic model, the decision theoretic model constructed to maximize an expected increase in profits; setting a solicitation variable to a first value for each of a plurality of members of the solicitation sub-population and to a second value for each of a plurality of members of the non-solicitation sub-population; soliciting the sub-population identified to solicit; and setting a purchase variable to a first value for each of the plurality of members of the solicitation and the non-solicitation sub-population that made a purchase and to a second value for each of the plurality of members of the solicitation and the non-solicitation sub-populations that did not make the purchase.. (*See e.g.*, paragraph [0057], [0062], [0064], [0088])

B. Claim 10

Claim 10 recites the method of claim 1, wherein soliciting the sub-population identified comprises calling each of a plurality of members of the sub-population.. (*See e.g.*, paragraph [0091])

C. Independent Claim 11

Independent claim 11 recites a computer-implemented method for constructing a decision theoretic model to identify a sub-population of a population to solicit to maximize an expected increase in profits, comprising: using a sample of the population to obtain values for the sample of the population for each of a solicitation variable and a purchase variable, the solicitation variable having a first value corresponding to solicitation and a second value corresponding to non-solicitation, and the purchase variable having a first value corresponding to purchase and a second value corresponding to non-purchase; dividing the sample of the population into a non-solicitation group and a solicitation group; setting the solicitation variable to the first value for each of a plurality of members of the solicitation group and to the second value for each of a plurality of members of the non-solicitation group; soliciting the solicitation group; setting the purchase variable to the first value for each of the plurality of members of the solicitation and the non-solicitation groups that made a purchase and to the second value for each of the plurality of members of the solicitation and the non-solicitation groups that did not make the purchase; utilizing a computer-implemented component to construct a decision tree as the decision theoretic model from the sample using a predetermined scoring criterion, the decision tree having a plurality of paths from a root node to a plurality of leaf nodes, each of the plurality of paths having a split on the solicitation variable, and each of the plurality of leaf nodes providing a value for a probability conditional on at least the purchase variable; and, applying the decision tree against the population to identify the sub-population to solicit to maximize the expected increase in profits. (*See e.g.*, paragraph [0057], [0062], [0064], [0088], [0093])

D. Independent Claim 24

Independent claim 24 recites a computer-implemented method for constructing a decision theoretic model to identify a sub-population of a population to solicit and a non-solicited sub-population to maximize an expected increase in profits, comprising: using a sample of the

population to obtain values for the sample of the population for each of a solicitation variable and a purchase variable, the solicitation variable having a first value corresponding to solicitation and a second value corresponding to non-solicitation, and the purchase variable having a first value corresponding to purchase and a second value corresponding to non-purchase; utilizing a computer implemented module for constructing a decision tree as the decision theoretic model from the sample using a greedy approach and a marginal likelihood scoring criterion, the decision tree having a plurality of paths from a root node to a plurality of leaf nodes, each of the plurality of paths having a last split on the solicitation variable, and each of the plurality of leaf nodes providing a value for a probability conditional on at least the purchase variable; applying the decision tree against the population to identify the sub-population to solicit to maximize the expected increase in profits; setting a solicitation variable to the first value for each of a plurality of members of the solicitation sub-population and to a second value for each of a plurality of members of the non-solicitation sub-population; and setting a purchase variable to the first value for each of the plurality of members of the solicitation and the non-solicitation sub-populations that made a purchase and to a second value for each of the plurality of members of the solicitation and the non-solicitation sub-populations that did not make the purchase. (*See e.g.*, paragraph [0057], [0062], [0064], [0088], [0093])

E. Independent Claim 28

Independent claim 28 recites a computer implemented system for improving profits associated with advertising, comprising: a module that receives input regarding a population; (*See e.g.*, paragraph [0058]) a decision theoretic model that determines a subset of the population to solicit with the advertising and a non-solicited sub-population so as to maximize an expected increase in profits from the solicitation; (*See e.g.*, paragraph [0064] and [0088]) means for setting a solicitation variable to a first value for each of a plurality of members of the solicitation sub-population and to a second value for each of a plurality of members of the non-solicitation sub-population; (*See e.g.*, paragraph [0062]) and means for setting a purchase variable to a first value for each of the plurality of members of the solicitation and the non-solicitation sub-populations that made a purchase and to a second value for each of the plurality of members of the solicitation and the non-solicitation sub-populations that did not make the purchase. (*See e.g.*, paragraph [0062])

VI. Grounds of Rejection to be Reviewed (37 C.F.R. §41.37(c)(1)(vi))

A. Whether claims 1, 9 and 28 are unpatentable under 35 U.S.C. §103(a) over Grosser *et al.* (U.S. 6,826,552), and in further view of Garg (U.S. 6,044,357).

B. Whether claims 2-8, 11, 13-27, 29 and 30 are unpatentable under 35 U.S.C. §103(a) over Grosser *et al.,* in further view of Garg and Kohavi (U.S. 6,182,058).

C. Whether claim 10 is unpatentable under 35 U.S.C. §103(a) over Grosser *et al.,* in further view of Garg and Cooper *et al.* (U.S. 5,737,416).

VII. Argument (37 C.F.R. §41.37(c)(1)(vii))

A. Rejection of Claims 1, 9 and 28 Under 35 U.S.C. §103(a)

Claims 1, 9 and 28 are rejected under 35 U.S.C. 103(a) as being obvious over Grosser *et al.* (U.S. 6,826,552), and in further view of Garg (U.S. 6,044,357). It is respectfully submitted that this rejection should be withdrawn for at least the following reasons. Grosser *et al.* in view of Garg does not teach or suggest each and every limitation of applicants' claimed invention.

> To reject claims in an application under §103, an examiner must establish a *prima facie* case of obviousness. A *prima facie* case of obviousness is established by a showing of three basic criteria. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. *See* MPEP §706.02(j). The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art and not based on applicant's disclosure. *See In re Vaeck,* 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

The subject invention relates to methods and systems for identifying a sub-population of a population to solicit and a sub-population of the population not to solicit that will maximize

profits for an advertiser performing solicitation. For instance, applicants' claimed invention can take a sample of a population of potential purchasers, divide the sample into a solicitation group and a non-solicitation group, and solicit the solicitation group. Tracking of purchases and non-purchases by members of each group allows for a model to be constructed that can be used against the entire population to identify a sub-population to solicit and a sub-population not to solicit that will maximize profits. Applicants' claimed invention minimizes solicitation of members who will not make a purchase, who are already planning on buying, and/or who planned on buying but will not buy if solicited, thereby reducing cost of solicitation. The method also increases solicitation to a subset of members who will buy if solicited, thereby maximizing purchases. In particular, as recited in independent claims 1 and 28, applicants' claimed invention employs a computer-implemented component to ***identify the sub-population to solicit and a non-solicited sub-population by using a computer-implemented decision theoretic model … setting a solicitation variable to a first value for each of a plurality of members of the solicitation sub-population and to a second value for each of a plurality of members of the non-solicitation sub-population*** and ***sets a purchase variable to a first value for each of the plurality of members of the solicitation and the non-solicitation sub-population that made a purchase and to a second value for each of the plurality of members of the solicitation and the non-solicitation sub-populations that did not make the purchase***.

Grosser *et al.* does not teach or suggest the aforementioned novel aspects of applicants' claimed invention. Rather, Grosser *et al.* discloses a computer aided decision making system that assists a user in making a decision regarding large purchases, such as a home or automobile. Applicants' claimed invention is focused on aiding a seller/advertiser in making a decision on which members of a group of potential buyers should be sent a solicitation/advertisement. The cited reference is focused on aiding a buyer in making a purchase decision concerning several purchase options. The system of Grosser *et al.* will employ a search engine to seek out purchase proposals that meet a user's requirements. The system further allows the user to solicit input from one or more advocates (family member, friend, etc.) on proposals. The system allows advocates who are not solicited to provide input. These advocates provide their opinions on the proposals, but are not themselves making purchases. The user is then able to evaluate the proposals and the feedback from advocates, and reject proposals. The Examiner cites column 5, lines 33-40 of the cited reference as teaching the *setting a solicitation variable to a first value for*

each of a plurality of members of the solicitation sub-population and to a second value for each of a plurality of members of the non-solicitation sub-population. This section of the cited reference says "Through advocates 101, computer-aided decision-making system 100 conveys to the user information useful to the decision-making context from a particular point of view. Relatively large differences between one or more attribute values of proposals in the user's "short list" of choices and the corresponding attribute values associated with new user choice inputs may trigger an unsolicited advocate 101 opinion." This section merely states that one of the advocates may provide unsolicited advice if they see a large difference between the purchase proposals in the user's short list of proposals and associated attributes. The Office Action asserts that the attributes, which are associated with the short list, represent the variables used to indicate which advocate will produce an unsolicited opinion. Advocates may use this information to decide if they are going to provide unsolicited information. However, these attributes are associated with the proposal, not the advocate, and provide no indication of which advocate will provide unsolicited advice and which advocate will not provide unsolicited advice. The Office Action further asserts that the user's input of new user choices represents the second value of non-solicitations. This section, as well as elsewhere in the cited reference simply means that the user is able to add or remove proposals from their short list and has nothing to do with indicating advocates that are not solicited. The cited reference does not state that any variables are set for each member to indicate which members are solicited or unsolicited. The Office action further cites col. 5, lines 48-52, which states, "Further, the user may provide value parameters via user input to the Requirements facet for computer-aided decision-making system 100 to use, in conjunction with other information, in triggering an advocate response to the user" as evidence of variables. These are merely purchase parameters that the user enters into the system to indicate their requirements for this purchase. These parameters are not associated with the advocates.

Moreover, the Examiner cites col. 5, lines 48-52 and col. 10, lines 26-44 as teaching *setting a purchase variable to a first value for each of the plurality of members of the solicitation and the non-solicitation sub-population that made a purchase and to a second value for each of the plurality of members of the solicitation and the non-solicitation sub-populations that did not make the purchase*. On the contrary, Grosser *et al.* describes the user interface providing a means for the user to enter their purchase requirements, so that advocates can provide advice and

a report screen that tracks which proposals the user is still considering and which have been rejected. The Office Action appears to suggest that the proposals still being considered and the ones that are rejected represent the purchase variable. However, this interface is merely providing information about the status of the proposal and does not provide any purchase variable associated with a member who is solicited and a member who is not solicited. Grosser *et al.* does not teach a user of the system sending solicitations to potential buyers and then setting a purchase variable to a first value for those potential buyers that made a purchase and setting the purchase variable to a second value for those potential buyers that did not make a purchase as in applicants' claimed invention. Rather, the reference discloses sending solicitations to advocates for feedback and does not set any solicitation variable or purchase variable for each advocate. Grosser *et al.* is not concerned with purchase decisions of advocates, but is concerned with gathering input from the advocates so that the user of the system can make a purchase decision. Therefore, Grosser *et al.* does not teach or suggest setting a solicitation variable to a first value for each of a plurality of members of the solicitation sub-population and to a second value for each of a plurality of members of the non-solicitation sub-population and sets a purchase variable to a first value for each of the plurality of members of the solicitation and the non-solicitation sub-population that made a purchase and to a second value for each of the plurality of members of the solicitation and the non-solicitation sub-populations that did not make the purchase as in applicants' claimed invention. In addition, Garg is silent regarding setting either a solicitation or purchase variable for each member of a population as taught in the subject claim. Garg discloses evaluating marketing strategies, but employs aggregated demand variables for a population for tracking success.

Furthermore, Grosser *et al.* and Garg do not teach or suggest *identifying the sub-population to solicit and a non-solicited sub-population by using a computer-implemented decision theoretic model*. Applicants' claimed invention teaches a system that identifies a sub-population to solicit and a sub-population not to solicit by employing a decision theoretic model. The model identifies the solicited and non-solicited sub-populations based upon how solicitation will maximize profits for the advertiser. Neither of the cited references is concerned with trying to identify the sub-population to solicit and the sub-population not to solicit. Grosser *et al.* is concerned with assisting a buyer in determining where to purchase from multiple proposals possibly from a variety of sellers. The cited reference simply teaches soliciting advocates for

feedback concerning purchase proposals, not for the advocates to make a purchase. *Grosser et al. does not identify the solicited and non-solicited populations by employing a decision theoretic model*. Rather, the reference discloses that the user of the system chooses which advocates to solicit for feedback. Moreover, Garg discloses a model to maximize profits through management of marketing, operations, and finance activities, however, Garg fails to teach or suggest the a decision theoretic model is employed to *identify the solicited and non-solicited populations*. Therefore, contrary to assertions in the Office Action, Grosser *et al.* and Garg do not teach or suggest *identifying the sub-population to solicit and a non-solicited sub-population by using a computer-implemented decision theoretic model*, as claimed.

In view of at least the foregoing, applicants' representative respectfully submits that Grosser *et al*. and Garg, alone or in combination, fail to teach or suggest all limitations of applicants' invention as recited in independent claims 1 and 28 (and claim 9 that depends there from), and thus fails to make obvious the subject claims. Therefore, this rejection should be withdrawn.

B. Rejection of Claims 2-8, 11, 13-27, 29, 30 Under 35 U.S.C. §103(a)

Claims 2-8, 11, 13-27, 29, 30 are rejected under 35 U.S.C. 103(a) as unpatentable over Grosser *et al.,* in further view of Garg as applied to claim 1 above, and further in view of Kohavi (U.S. 6,182,058). It is respectfully submitted that this rejection should be withdrawn for at least the following reasons. Grosser *et al.* in view of Garg and Kohavi does not teach or suggest each and every limitation of applicants' claimed invention.

Independent claims 11 and 24 (similarly to independent claims 1 and 28) recite ***setting the solicitation variable to the first value for each of a plurality of members of the solicitation group and to the second value for each of a plurality of members of the non-solicitation group; setting the purchase variable to the first value for each of the plurality of members of the solicitation and the non-solicitation groups that made a purchase and to the second value for each of the plurality of members of the solicitation and the non-solicitation groups that did not make the purchase;… applying the decision tree against the population to identify the sub-population to solicit***. As discussed *supra* with respect to independent claims 1 and 28, Grosser *et al.* and Garg fail to teach or suggest these novel features of the subject claims.

Furthermore, Kohavi fails to make up for the deficiencies of Grosser *et al*. and Garg with respect to these claimed features.

Kohavi discloses a hybrid classifier, called the NB-Tree classifier, for classifying a set of records. In an example, Kohavi discloses a marketing campaign where responses are tracked to determine who is likely to respond. However, Kohavi fails to teach or suggest a solicitation variable that is set to the first value for each of a plurality of members of the solicitation group and to the second value for each of a plurality of members of the non-solicitation group. Kohavi does not indicate that unsolicited members are tracked and therefore would not need to set a solicitation variable. Furthermore, Kohavi also fails to teach a purchase variable that is set with a first value for purchase and a second value for non-purchase. A likeliness to respond is not analogous to a purchase. A recipient of the marketing campaign may respond, such as to request more information or look at a product, without ever making a purchase. Moreover, Kohavi fails to mention purchase or buy anywhere in the patent.

Therefore, Grosser *et al.*, Garg and Kohavi do not teach or suggest setting the solicitation variable to the first value for each of a plurality of members of the solicitation group and to the second value for each of a plurality of members of the non-solicitation group and setting the purchase variable to the first value for each of the plurality of members of the solicitation and the non-solicitation groups that made a purchase and to the second value for each of the plurality of members of the solicitation and the non-solicitation groups that did not make the purchase;… and applying the decision tree against the population to identify the sub-population to solicit to maximize the expected increase in profits as in applicants' claimed invention.

Claims 2-8 and 29-30 depend from independent claims 1 and 28 respectively. As discussed above with respect to independent claims 11 and 24, Kohavi fails to cure the above noted deficiencies of Grosser *et al*. and Garg regarding independent claims 1 and 28.

In view of at least the above, it is respectfully submitted that Grosser *et al*., Garg and Kohavi, alone or in combination, fail to teach or suggest all aspects of applicants' invention as recited in independent claims 1, 11, 24, and 29 (and claims 2-8, 13-23, and 25-27 that depend there from), and thus fails to make obvious the subject claimed invention. This rejection should be withdrawn.

C. Rejection of Claim 10 Under 35 U.S.C. §103(a)

Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Grosser *et al.,* in further view of Garg, as applied to claim 1 above, and further in view of Cooper *et al.* (U.S. 5,737,416). It is respectfully submitted that this rejection should be withdrawn for at least the following reasons. The cited references, alone or in combination, do not teach or suggest each and every feature of applicants' claimed invention.

Claim 10 depends from independent claim 1. Cooper *et al.* fails to cure the above noted deficiencies of Grosser *et al*. and Garg with respect to independent claim 1. Cooper *et al.* discloses a system for allowing a producer of software to provide a trial period for use of the software when a potential buyer initiates a request for said software, while maintaining security over the files to prevent piracy. Cooper *et al*. fails to teach or suggest solicitation and non-solicitation sub-populations and maintaining a solicitation and purchase variable for members of each group. Cooper *et al.* is silent regarding setting a solicitation variable to a first value for each of a plurality of members of the solicitation sub-population and to a second value for each of a plurality of members of the non-solicitation sub-population; setting a purchase variable to the first value for each of the plurality of members of the solicitation and the non-solicitation groups that made a purchase and to the second value for each of the plurality of members of the solicitation and the non-solicitation groups that did not make the purchase;… and applying the decision tree against the population to identify the sub-population to solicit, as claimed.

Accordingly, withdrawal of this rejection is respectfully requested.

D. CONCLUSION

The present application is believed to be in condition for allowance in view of the above comments. A prompt action to such end is earnestly solicited.

In the event any fees are due in connection with this document, the Commissioner is authorized to charge those fees to Deposit Account No. 50-1063 [MSFTP282US].

Should the Examiner believe a telephone interview would be helpful to expedite favorable prosecution, the Examiner is invited to contact applicants' undersigned representative at the telephone number below.

Respectfully submitted,

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VIII. Claims Appendix (37 C.F.R. §41.37(c)(1)(viii))

1. A computer-implemented method for soliciting a sub-population of a population, comprising:

employing a computer-implemented component to identify the sub-population to solicit and a non-solicited sub-population by using a computer-implemented decision theoretic model, the decision theoretic model constructed to maximize an expected increase in profits;

setting a solicitation variable to a first value for each of a plurality of members of the solicitation sub-population and to a second value for each of a plurality of members of the non-solicitation sub-population;

soliciting the sub-population identified to solicit; and

setting a purchase variable to a first value for each of the plurality of members of the solicitation and the non-solicitation sub-population that made a purchase and to a second value for each of the plurality of members of the solicitation and the non-solicitation sub-populations that did not make the purchase.

2. The method of claim 1, wherein using the computer-implemented decision theoretic model comprises using a decision tree, the decision tree having a plurality of paths from a root node to a plurality of leaf nodes, each of the plurality of paths having a split on a solicitation variable having a first value corresponding to solicitation and a second value corresponding to non-solicitation.

3. The method of claim 2, wherein the decision tree is constructed such that the split on the solicitation variable of each of the plurality of paths is a last split.

4. The method of claim 2, wherein the decision tree is constructed such that the split on the solicitation variable of each of the plurality of paths is a first split.

5. The method of claim 2, wherein each of the plurality of leaf nodes provides a value for a probability conditional on at least a purchase variable having a first value corresponding to purchase and a second value corresponding to non-purchase.

6. The method of claim 2, wherein identifying the sub-population to solicit comprises computer-implemented acts of:

constructing the decision tree from a sample of the population using a predetermined scoring criterion, each of the plurality of leaf nodes of the tree providing a value for a probability conditional on at least a purchase variable; and,

applying the decision tree against the population to identify the sub-population to solicit to maximize the expected increase in profits.

7. The method of claim 6, wherein identifying the sub-population to solicit further initially comprises performing an experiment using a sample of the population to obtain values for the sample of the population for each of the solicitation variable and a purchase variable, the purchase variable having a first value corresponding to purchase and a second value corresponding to non-purchase.

8. The method of claim 1, wherein soliciting the sub-population identified comprises mailing a solicitation to each of a plurality of members of the sub-population.

9. The method of claim 1, wherein soliciting the sub-population identified comprises e-mailing a solicitation to each of a plurality of members of the sub-population.

10. The method of claim 1, wherein soliciting the sub-population identified comprises calling each of a plurality of members of the sub-population.

11. A computer-implemented method for constructing a decision theoretic model to identify a sub-population of a population to solicit to maximize an expected increase in profits, comprising:

using a sample of the population to obtain values for the sample of the population for each of a solicitation variable and a purchase variable, the solicitation variable having a first value corresponding to solicitation and a second value corresponding to non-solicitation, and the purchase variable having a first value corresponding to purchase and a second value corresponding to non-purchase;

dividing the sample of the population into a non-solicitation group and a solicitation group;

setting the solicitation variable to the first value for each of a plurality of members of the solicitation group and to the second value for each of a plurality of members of the non-solicitation group;

soliciting the solicitation group;

setting the purchase variable to the first value for each of the plurality of members of the solicitation and the non-solicitation groups that made a purchase and to the second value for each of the plurality of members of the solicitation and the non-solicitation groups that did not make the purchase;

utilizing a computer-implemented component to construct a decision tree as the decision theoretic model from the sample using a predetermined scoring criterion, the decision tree having a plurality of paths from a root node to a plurality of leaf nodes, each of the plurality of paths having a split on the solicitation variable, and each of the plurality of leaf nodes providing a value for a probability conditional on at least the purchase variable; and,

applying the decision tree against the population to identify the sub-population to solicit to maximize the expected increase in profits.

12. (Cancelled)

13. The computer-implemented method of claim 11, wherein construction of the decision tree comprises using a greedy approach.

14. The computer-implemented method of claim 11, wherein the predetermined scoring criterion is a holdout criterion.

15. The computer-implemented method of claim 11, wherein the predetermined scoring criterion is a cross-validation holdout criterion.

16. The computer-implemented method of claim 11, wherein the predetermined scoring criterion is a marginal likelihood criterion.

17. The computer-implemented method of claim 11, wherein the predetermined scoring criterion is an adjusted marginal likelihood criterion.

18. The computer-implemented method of claim 11, wherein the split on the solicitation variable of each of the plurality of paths is a last split.

19. The computer-implemented method of claim 18, wherein constructing the decision tree comprises: initializing the decision tree with an initial single leaf node as the root node;

using the greedy approach to construct the decision tree with no splits on the solicitation variable, the decision tree after construction using the greedy approach having a plurality of interim leaf nodes; and,

performing a split on the solicitation variable at each of the plurality of interim leaf nodes to generate the plurality of leaf nodes.

20. The computer-implemented method of claim 11, wherein the split on the solicitation variable of each of the plurality of paths is a first split at the root node.

21. The computer-implemented method of claim 20, wherein constructing the decision tree comprises:

initializing the decision tree with the first split at the root node on the solicitation variable; and,

using a greedy approach to finish constructing the decision tree.

22. The computer-implemented method of claim 11, further comprising soliciting the sub-population identified.

23. The computer-implemented method of claim 11, wherein the method is performed by execution of a computer program by a processor from a computer-readable medium.

24. A computer-implemented method for constructing a decision theoretic model to identify a sub-population of a population to solicit and a non-solicited sub-population to maximize an expected increase in profits, comprising:

using a sample of the population to obtain values for the sample of the population for each of a solicitation variable and a purchase variable, the solicitation variable having a first value corresponding to solicitation and a second value corresponding to non-solicitation, and the purchase variable having a first value corresponding to purchase and a second value corresponding to non-purchase;

utilizing a computer implemented module for constructing a decision tree as the decision theoretic model from the sample using a greedy approach and a marginal likelihood scoring criterion, the decision tree having a plurality of paths from a root node to a plurality of leaf nodes, each of the plurality of paths having a last split on the solicitation variable, and each of the plurality of leaf nodes providing a value for a probability conditional on at least the purchase variable;

applying the decision tree against the population to identify the sub-population to solicit to maximize the expected increase in profits;

setting a solicitation variable to the first value for each of a plurality of members of the solicitation sub-population and to a second value for each of a plurality of members of the non-solicitation sub-population; and

setting a purchase variable to the first value for each of the plurality of members of the solicitation and the non-solicitation sub-populations that made a purchase and to a second value for each of the plurality of members of the solicitation and the non-solicitation sub-populations that did not make the purchase.

25. The computer-implemented method of claim 24 further comprising:

dividing the sample of the population into a non-solicitation group and a solicitation group;

setting the solicitation variable to the first value for each of a plurality of members of the solicitation group and to the second value for each of a plurality of members of the non-solicitation group;

soliciting the solicitation group; and,

setting the purchase variable to the first value for each of the plurality of members of the solicitation and the non-solicitation groups that made a purchase and to the second value for each of the plurality of members of the solicitation and the non-solicitation groups that did not make the purchase.

26. The method of claim 24, further comprising soliciting the sub-population identified by one of: calling each of a plurality of members of the sub-population, mailing a solicitation to each of the plurality of members of the sub-population, and e-mailing the solicitation to each of the plurality of members of the sub-population.

27. The computer-implemented method of claim 24, wherein the method is performed by execution of a computer program by a processor from a computer-readable medium.

28. A computer implemented system for improving profits associated with advertising, comprising:

a module that receives input regarding a population;

a decision theoretic model that determines a subset of the population to solicit with the advertising and a non-solicited sub-population so as to maximize an expected increase in profits from the solicitation;

means for setting a solicitation variable to a first value for each of a plurality of members of the solicitation sub-population and to a second value for each of a plurality of members of the non-solicitation sub-population; and

means for setting a purchase variable to a first value for each of the plurality of members of the solicitation and the non-solicitation sub-populations that made a purchase and to a second value for each of the plurality of members of the solicitation and the non-solicitation sub-populations that did not make the purchase.

29. The system of claim 28, wherein the decision theoretic model comprises a decision tree, the decision tree includes a plurality of paths from a root node to a plurality of leaf nodes, each of the plurality of paths having a split on the solicitation variable having a first value corresponding to solicitation and a second value corresponding to non-solicitation.

30. The system of claim 29, wherein each of the plurality of leaf nodes provides a value for a probability conditional on at least the purchase variable having a first value corresponding to purchase and a second value corresponding to non-purchase.

IX. Evidence Appendix (37 C.F.R. §41.37(c)(1)(ix))

None.

X. Related Proceedings Appendix (37 C.F.R. §41.37(c)(1)(x))

None.